



DAMPING OFF OF BEETS IN THE FIELD.

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A case of damping off in field culture of beets came to the notice of the Department in May, 1900, and appears to be the first instance of the kind on record. The trouble occurred in the northern part of the State on the farm of Mr. E. T. Mudge, of Medaryville, destroying the larger part of the beets in a field of fifty acres. Samples of healthy and diseased beets, and of the soil in which they grew, were sent to this Station, providing ample material for study.

The beets at the time of the attack were in the first to third leaf following the seed leaves, having been planted about three weeks, and therefore still small seedlings. The roots and stem below ground became black and lifeless, especially the part just beneath the soil, and the top, deprived of nutriment, dropped over on the ground and withered. There was no indication of insect work of any kind. An examination of the roots with a microscope revealed the constant presence of fungous mycelium in the softer tissues. The fungus was composed of colorless branching threads of quite uniform size, winding about between the cells of the cortical part of the root. Comparing the fungus and the behavior of the diseased plants with what is known regarding damping off, as seen commonly in greenhouses, there appears to be no doubt that here was a case of this sort of disease appearing in field culture.

Damping off is due to attack from any one of a number of species of fungi. Attempts were made to induce the fungus in the beet seedlings to fruit by putting into moist chambers, but without avail. In the absence of fruiting parts, it is impossible to name the fungus or even to intelligently guess at its identity. All that can be said is that owing to the attack of some fungus, capable of penetrating the live tissues of the beet seedlings, the young plants were killed.

The conditions under which damping off fungi flourish in the greenhouse are moisture, warmth, and a closeness of the plants that enables the fungus to readily extend from one plant to the next through the damp soil. These conditions are most often met in the cutting bench. If the soil contains decaying vegetable matter, thus furnishing nutriment for the fungous filaments as they extend out from the infested plant, there is a corresponding greater luxuriance in the development.

All these conditions appear to have been fulfilled in the field of diseased beets at Medaryville. The soil was a black, sandy loam; the seedling beets were close enough together in the row to enable the fungus to pass from one plant to the next from end to end of the field; and the warm, damp days in May furnished most favorable atmospheric conditions; and lastly the earth was of that peculiar richness and texture well fitted to promote saprophytic growth. There is a high probability therefore, that the fungus, very likely starting from many centers, spread along the rows throughout the field, missing, of course, some drier spots and isolated plants, and by its vigorous growth brought about wholesale damping off.

The fungus originated, probably, not from the soil, but from the seed used for planting. The rough, spongy husk of beet seed provides a good harborage for fungus spores, but this growth usually does no harm to the seedling beets from absence of favoring conditions. Although some sorts of spores are present in about all beet seed, yet it may be doubted if those of the particular kind capable of causing damping off are always, or even usually, present.

I am informed by Mr. Charles K. Farmer, field superintendent of the Wolverine Sugar Company, that a disease very similar to this one, affected young sugar beets in Michigan during the spring of 1899. It passed under the name of "Black root," and differed from the Indiana outbreak chiefly in its failure to kill the plants outright. The surface tissues of the roots blackened, but the central axis remained alive, and in fields that were not plowed up, the plants largely recovered. No microscopical examination was made.

A remedy for the disease, after it has once started in a field, seems out of the question. Sometimes, however, weather or other conditions check its spread. It would probably be possible to sterilize the beet seed used for planting. Either formalin or hot water could doubtless be used to destroy the fungous spores without impairing the vitality of the seed, and possibly with direct beneficial effects in promoting germination. Details for treatment cannot be given, as no experiments have been made. If this method of ridding the seed of the germs of disease proves available, it might be profitable to treat all beet seed before planting, but especially that to be used in fields having certain rich, light soils.

